Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-3 (canceled)

4. (currently amended) An embeddable system for detecting and measuring corrosion in a structure susceptible to corrosion, said system including a plurality of embeddable corrosion rate meters (ECRM) for collecting corrosion measurements data and at least one computing device for analyzing said corrosion measurements, said system comprising:

at least one working electrode evenly separated from a counter electrode, wherein a separation distance between said at least one working electrode and said counter electrode determines an electrolyte medium resistance, said electrolyte medium resistance is less than or equal to a polarization resistance;

a signal generator for generating a current source, said current source is connected to a plurality of resistances for creating a plurality of current amplitudes;

a first selector for applying current through each of said plurality of resistances to said at least one working electrode and said counter electrode, wherein said current is applied via a galvanostat; and

an external reader-head with a data link and power link connected to said computing device for powering said ECRM and transferring corrosion measurements data via said data link; and

a programmable electronic chip having a voltage output, wherein said chip is programmed to include a voltage-time signal, said voltage-time signal including a plurality of sine waves; and said galvanostat for receiving and converting said voltage output into a current-time perturbation signal.

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5. (currently amended) The system of Claim 4, wherein said ECRM is between about 1 to about 5 1 and 5 centimeters in diameter and between about 0.2 to about 1 0.2 and 1 centimeters in height.

6. (original) The system of Claim 4, wherein said counter electrode is separated from said at least one working electrode by holder material.

7. (original) The system of Claim 4, wherein said working electrode is made from the same material as the structure being detected for corrosion.

8. (original) The system of Claim 7, wherein the material is a metal selected from the group consisting of iron, carbon steel, stainless steel, super alloy steel, copper, zinc, aluminum, titanium, and alloys and combinations thereof.

9. (original) The system of Claim 4 wherein the structure is a rebar, storage tank, chamber, duct, tube or composite material.

10. (original) The system of Claim 4, wherein said counter electrode is made from a non-corroding inert material.

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11. (currently amended) The system of Claim [4] 10, wherein the non-corroding inert material is selected from the group consisting of titanium oxide and ruthenium oxide, graphite, dimensionally stable palladium-coated titanium, and steel.

12. (currently amended) The system of Claim 4, further comprising:
a second selector for selecting the duration of a current pulse; and,
a voltmeter/A-D voltmeter and A-D converter for measuring polarization of said working electrode, wherein said voltmeter has an input impedance greater than 10^9 ohms.

13. (original) The system of Claim 4, wherein said corrosion measurements data is used for graphing a plot of I_j vs. $(V_p)_j$, with OCV as the origin and estimating a slope of the plot of I_j vs. $(V_p)_j$, wherein said slope provides the value of the polarization resistance, R_p, which is inversely proportional to the corrosion rate.

14. (original) The system of Claim 4, wherein said corrosion measurements data is obtained by disconnecting said galvanostat from said working electrode and said counter electrode and measuring a voltage difference between said working electrode and said counter electrode.

15. (currently amended) The system of Claim 14,
An embeddable system for detecting and measuring corrosion in a structure susceptible to corrosion, said system including a plurality of embeddable corrosion rate meters (ECRM) for collecting corrosion measurements data and at least one computing device for analyzing said corrosion measurements, said system comprising:
at least one working electrode evenly separated from a counter electrode, wherein a separation distance between said at least one working electrode and said counter electrode

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determines an electrolyte medium resistance, said electrolyte medium resistance is less than or equal to a polarization resistance;

a signal generator for generating a current source, said current source is connected to a plurality of resistances for creating a plurality of current amplitudes;
a first selector for applying current through each of said plurality of resistances to said at least one working electrode and said counter electrode, wherein said current is applied via a galvanostat; and

an external reader-head with a data link and power link connected to said computing device for powering said ECRM and transferring corrosion measurements data via said data link,

wherein said corrosion measurements data is obtained by disconnecting said galvanostat from said working electrode and said counter electrode and measuring a voltage difference between said working electrode and said counter electrode, and

wherein said measurement is performed by setting a variable j to 0, where j is an integer value from 0 to n.

a) incrementing j and setting a current pulse amplitude to I_j, wherein amplitudes for current pulses are in the ± 0.1 to ± 10 μA range;

b) starting a 1 ms current pulse at pre-set amplitude and measuring said voltage difference between working electrode and said counter electrode, storing said difference as 1 ms closed circuit voltage ($CCV_{@1ms}$) between said working electrode and said counter electrode for the 1 ms current pulse at set amplitude I_j;

c) starting a 500 ms current pulse at pre-set amplitude and measuring said voltage difference between working electrode and said counter electrode, storing said difference 500 ms closed circuit voltage ($CCV_{@500ms}$) between said working electrode and said counter electrode for the 500 ms current pulse at set amplitude I_j, wherein a difference between $CCV_{@1ms}$ and $CCV_{@500ms}$ provides $(V_p)_j$;

d) repeating steps b-c for current amplitude values of I_2 through I_j, as well as at $-I_1$, through $-I_j$, and estimating the value of $(V_p)_j$ for each I_j value.

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16 (canceled).

17. (original) The system of Claim 4, further comprising a unique electronic radio-frequency ID for identification of said ECRM.

18-21 (canceled)

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